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EVALUATION OF PEST CONDITIONS IN THE HUNTERS RIDGE SALE, BIG VALLEY RANGER DISTRICT, MODOC NATIONAL FOREST

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ABSTRACT

Forest Pest Management conducted an evaluation of a planned timber sale on Hunters Ridge on the Big Valley Ranger District. The stands, predominantly white fir with scattered Jeffrey pine, are affected by numerous Fomes annosus infection centers in the white fir, and white fir dwarf mistletoe. The area also harbors a large population of pocket gophers. Management alternatives are regeneration with either white fir, Jeffrey pine, or a mixture of the two species if intensive cultural treatments are undertaken.

INTRODUCTION

A timber sale is planned on Hunters Ridge on the Big Valley Ranger District. District personnel had detected some potential pest problems in the area and requested an evaluation. The sales area was evaluated on July 20, 1983 by Dave Schultz and James Allison from the Forest Pest Management Staff, and Vern Neal and Steve Torres from the District.

OBSERVATIONS

The sales area is located at an elevation of about 6,600 to 6,800 ft. The stands have been previously entered, which has resulted in some fairly large holes. The stands are predominantly white fir with scattered Jeffrey pine. All size classes of white fir from saplings to mature sawtimber are present, and infected with dwarf mistletoe, Arceuthobium abietinum f. sp. concoloris. The sales areas have numerous

hollow white fir stumps which contain Fomes annosus conks. There has been a small amount of windthrow associated with Fomes annosus in saplings and small pole-size white fir. The fir engraver, Scolytus ventralis, has caused some mortality to the smaller size classes of white fir infected with Fomes annosus.

The few Jeffrey pine in the area are about equally divided between mature sawtimber and saplings that have seeded into open areas. The Jeffrey pine appear generally healthy and the reproduction is showing reasonable height growth.

The sales areas includes a fairly large wet meadow, springs, small streams and grassy openings. These relatively moist areas are refuges for pocket gophers, Thomomys spp. An existing skid trail cuts across the head of the wet meadow and provides a travelway for gophers to the adjacent stands. Past partial cutting has opened the stands in many areas and allowed the development of herbaceous vegetation. Signs of gopher activity were abundant in all areas examined.

DISCUSSION

The two disease problems observed in the sales area are both restricted to white fir. This offers an opportunity to avoid both problems by emphasizing pine when regenerating the areas. Annosus root rot rarely crosses from fir to pine. Pines planted in the annosus root rot centers in white fir should remain free of the disease. The dwarf mistletoe in white fir is host specific and will not infect pines planted in the area.

Jeffrey pine is present on the site and appears healthy. The current disease problems could be avoided by clear cutting and regenerating the site with Jeffrey pine. The fact that Jeffrey pine occurs only as scattered individuals in the current stand, however, may indicate the need to be cautious in selecting the proportion of the regeneration which is to be Jeffrey pine, or the areas in which to emphasize pine.

The impacts of Fomes annosus and dwarf mistletoe on white fir can be reduced through silvicultural treatments. The fungus is usually confined to the heartwood and inner sapwood of the larger roots where it causes a butt rot and reduced tree growth. The effects of Fomes annosus on white fir will vary, depending on how rapidly the trees are growing. Vigorous young firs are usually able to regenerate root tissues faster than they are lost to the root disease. Decay in the roots and butts will advance faster than new wood can be produced in trees that are growing slowly. This will lead to some windthrow, mortality, and cull in the butts. Some of the losses can be reduced by treatments which increase or maintain growth such as thorough site preparation, release, precommercial and commercial thinnings.

The same treatments that would reduce the impact of Fomes annosus in white fir would also reduce the effects of dwarf mistletoe. Dwarf mistletoe infections usually originate in the lower crown. White fir dwarf mistletoe usually spreads upward in the crown at a rate of 3-4

inches per year. True fir saplings and poles growing about one foot or more per year will outgrow the effects of any dwarf mistletoe. If leader growth of about 1 foot per year can be maintained, there will progressively be more uninfected crown than infected crown. With time, the dwarf mistletoe rating and the stress on the tree will be reduced. This assumes that overstory infection sources are eliminated by cutting or installing a buffer strip at about the same time that an infected understory is released. The width of the buffer strip should be equal to the height of the dwarf mistletoe plants in the surrounding true fir trees. If an infected overstory is maintained over, or within about 100 feet of white fir regeneration, the crowns will be continually infected and will not outgrow the mistletoe.

Gophers are present throughout the sales area and will cause severe problems for planted or natural regeneration. Some degree of control can probably be achieved prior to regenerating the area by reducing herbaceous vegetation during site preparation and by baiting burrow systems. These measures will not prevent gophers from migrating back into the regenerated areas from the moist areas that serve as refuges. Some features of the sale layout could affect the movement of gophers. A portion of the proposed sale would clearcut the stands adjacent to the wet meadow for "riparian area enhancement". This would eventually place conifer regeneration adjacent to an area harboring a large gopher population. The degree of gopher movement into the planted areas would be lower if a strip of existing forest cover was left between the meadow and the areas to be regenerated. Gophers would be present in the strip, but at low densities because mature forest with fairly complete crown closure is relatively poor gopher habitat. The benefits of leaving a forested strip would be substantially reduced if sales activities create gopher travelways across the strip. Skid trails, landings and areas where the soil has been loosened by ripping or discing are readily invaded by gophers. It would be easier to control gophers in regenerated areas if skid trails and other activities that disturb soil were laid out so they did not lead gophers from moist areas to the conifer regeneration.

MANAGEMENT ALTERNATIVES

1. Do Nothing. The site will eventually seed in with white fir and Jeffrey pine. It may take decades for all openings to be occupied because gophers will hinder regeneration. Much of the white fir will become infected with dwarf mistletoe and Fomes annosus. Dwarf mistletoe will slow the growth rate and bole cankers may cause stem decay and breakage. Slowly growing white fir which are infected with Fomes annosus will have elevated rates of mortality, windthrow and butt cull. The length of time until the next harvest will be longer, and the net return will be lower than anticipated.

2. Harvest mature timber and save advanced regeneration. Because of the size and density of the mature timber, it is likely that much of the advanced regeneration would be damaged during harvesting. The number of hollow stumps and cull logs from previous entries indicates there will probably be considerable cull in the proposed sale material. Yarding,

piling and burning unutilizable material will probably add to the damage to advanced regeneration. Most of the advanced regeneration is white fir. Basal wounds on true firs have a high probability of becoming infected with decay organisms, especially Fomes annosus. The amount of decay increases with time, so a fir wounded early in a rotation may have little sound wood by the end of the rotation. Much of the white fir advanced regeneration is infected with dwarf mistletoe. Although the effects of dwarf mistletoe on individual trees can be compensated for by thinning the stand, the leave trees can still serve as a source of infection to nearby trees. Leaving pockets of advanced regeneration could also make site preparation or gopher control efforts difficult.

3. Clearcut sites and replant. Clearing the sites would offer an opportunity to reduce vegetation that would compete with planted conifers and provide food for gophers. If all vegetation is to be removed from the site, there would be a chance of reducing the amount of Fomes annosus inoculum by burning. There would have to be enough fuel and the fire would have to be hot enough to burn out the stumps and the major roots to have much effect. Some portion of the plantation should be beyond the distance that white fir dwarf mistletoe could spread from infected trees on the edges. The area that would not be exposed to infection would depend on the size and shape of the cut. Fomes annosus and white fir dwarf mistletoe would not affect Jeffrey pine regeneration, but Jeffrey pine may not be adapted to the moist areas. White fir is likely to seed into the cuts within several chains of all boundaries. White fir can be successfully grown in the area if it is kept growing rapidly. Thorough site preparation, gopher control, at least one release treatment and probably a precommercial thinning would be required to keep the white fir growth ahead of the diseases present.